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## DOCTORAL DISSERTATIONS IN LOGIC

**ABSTRACT.** Doctoral dissertations of Serbian scientists who received PhD degree in logic at Universities in Serbia and other Universities in Europe and America will be presented. Moreover, Doctoral dissertations of Serbian scientists who gave a contribution to logic, but their dissertations belong to other areas of mathematics or philosophy, will be also presented.

### 1. Introduction

When we decided to prepare the reviews of Doctoral dissertations in logic of Serbian scientists the first step was to make a list of Serbian researches whose area of research belongs to logic or related areas of mathematics and philosophy. The works of these researches are closely connected to the work of Seminar for Algebra and Logic (i.e., Seminar for Mathematical Logic, see 4.1 below) and for that reason Professor Vukomanović's paper [4] about the history of that Seminar was very helpful in making the list of these researches. The next step was to find their Doctoral dissertations. To do that we used Virtual Library of the Faculty of Mathematics of Belgrade University ([5]), which contains almost all Doctoral dissertations in logic of the authors who obtained PhD degree at all Universities in Serbia, and at other Universities in Europe and America too. (In this paper the Doctoral dissertations from that Library will be marked with \*.)

Apart from Doctoral dissertations of scientists who received PhD degree in logic at Universities in Serbia, in this paper we will also present Doctoral dissertations of scientists who received PhD degree in logic at other Universities in Europe and America. Serbian scientists who gave valuable contribution to logic, but whose Doctoral dissertations do not belong to that area, will be mentioned too. Finally, our presentation will contain some Doctoral dissertations in mathematical and philosophical areas which are very close to logic, or use results and methods of logic.

The first Doctoral dissertations in logic of Serbian scientists from the 19th and 20th century will be presented in Section 2 and 3. In Section 4 we will consider the period 1950-1976 when the research of logic, as an area of mathematics and philosophy, begins with founding of Seminar for Algebra and Logic, and we will mention Doctoral dissertations of Professors who founded that Seminar. Since 1977, Serbian scientists have written a number of Doctoral dissertations which are contributions to logic or some related areas as philosophy or mathematical areas: algebra, topology and computer science. These dissertations will be presented in Sections 5–8.

## 2. The first Doctoral dissertation in logic

**Konstantin (Kosta) Branković** (1814-1865) was the first Serb whose area of research was modern logic. However, the first Doctoral dissertation in logic of a Serbian scientist was the one of Ljubomir Nedić. He obtained PhD degree in Leipzig in 1885:

**Ljubomir Nedić,**

Die Lehre von der Quantification des Praedicats in der neueren englischen Logik,  
Leipzig, German, 1885

## 3. 1900–1955

**3.1. Djuro Kurepa's dissertation.** In the 20th century the first Doctoral dissertation in logic of a Serbian scientist was Djuro Kurepa's dissertation. Professor Kurepa is probably the best known Serbian Logician, and his dissertation is a major contribution to set theory. He obtained PhD degree at the University of Paris, Sorbonne in 1935:

**Djuro Kurepa,**

Ensembles ordonnes et ramifies\*,

Universit de Paris, Sorbonne, France, 1935

Supervisor: Maurice Frechet

## 4. 1956–1977

In 1956 Professor Mihajlo Marković's obtained PhD degree at the University College London, and his dissertation is a contribution in logic:

**Mihajlo Marković,**

The Concept of Logic,

University College London, UK, 1956

**4.1. Seminar for Mathematical Logic.** At Belgrade University the research of modern logic as an area of mathematics and philosophy begins with the founding of Seminar for Algebra and Logic. In 1965 Professors Slaviša Prešić and Aleksandar Kron, together with some other mathematicians and philosophers, founded Seminar for Algebra and Logic at the Faculty of Mathematics. That seminar was later renamed into Seminar for Mathematical Logic and it has been a seminar of Mathematical Institute SANU since 1970. We present dissertations of Professors who founded that Seminar:

**Slaviša Prešić,**

Prilog teoriji algebarskih struktura\*

(A Contribution to the Theory of Algebraic Structures), 1963

Supervisor: Tadija Pejović

**Svetlana Knjazeva,**

Filozofija Lavovsko-Varšavske škole

(The Philosophy of Lviv-Warsaw's School), 1964

**Aleksandar Kron,**

Odnos polivalentnih logika i teorije verovatnoće

(Relation between Polyvalent Logics and Probability Theory), 1965

Professor Prešić's dissertation is a contribution to algebra. Professor Knjazeva's dissertation is a contribution to philosophy, and Professor Kron's dissertation is a contribution to logic.

Dissertations of members of Seminar for Mathematical Logic, Koriolan Gilezan, Marica Prešić and Nataša Božović, appeared in the period from 1970 to 1975:

**Koriolan Gilezan,**

Neke generalizacije pseudo-bulovog programiranja\*  
(Some Generalizations of Pseudo-Boolean Programming), 1971

Supervisor: Slaviša Prešić

**Marica Prešić,**

Jedan iterativni postupak za određivanje k korena polinoma\*  
(An Iterative Procedure of Determining k Polynomial Zeros), 1972

Supervisor: Djuro Kurepa

**Nataša Božović,**

Nerešivi problemi u teoriji grupa\*  
(Unsolvable Problems in Group Theory), 1975

Supervisor: Slaviša Prešić

These dissertations do not belong to logic, but to computer science and algebra.

**4.2. The Faculty of Electronics of the University of Niš.** Živko Tošić obtained PhD degree at the Faculty of Electronics in Niš, and his dissertation is a contribution to logic.

**Živko Tošić,**

Analitičke reprezentacije  $m$ -valentnih logičkih funkcija u prstenu modula  $m$   
(Analytical Representations of  $m$ -valued Logical Functions over the Ring of Integers Modulo  $m$ ), 1972

Supervisor: Dragoslav S. Mitrinović

## 5. 1977–1979

**5.1. The Faculty of Mathematics of Belgrade University.** Since 1977 there have been several dissertations as contributions to some areas of logic. They are as follows:

**Žarko Mijajlović,**

Prilog teoriji modela i Bulove algebre\*  
(A Contribution to Model Theory and Boolean Algebras), 1977

Supervisor: Slaviša Prešić

**Ratko Tošić,**

Prilog teoriji Bulovih algebri\*  
(A Contribution to the Theory of Boolean Algebras), 1978

Supervisor: Djuro Kurepa

**Gradimir Vojvodić,**

Prilog proučavanju raznovrednosnog predikatskog računa\*  
(A Contribution to Research of Mixed-Valued Predicate Calculus), 1979

Supervisor: Slaviša Prešić

**Stevo Todorčević,**

Rezultati i dokazi nezavisnosti u kombinatornoj teoriji skupova\*  
(Results and Proofs of Independence in Combinatorial Set Theory), 1979

Supervisor: Djuro Kurepa

Mijajlović's dissertation is a contribution to model theory and Tošić's to Boolean algebras. Vojvodić's dissertation is a contribution to mixed-valued predicate calculus and Todorčević's to combinatorial set theory.

**5.2. Universities in Europe and America.** Zoran Marković obtained PhD degree at the University of Pennsylvania in the USA, and his dissertation is a contribution to intuitionistic logic:

**Zoran Marković,**  
Model Theory for Intuitionistic Logic\*,  
University of Pennsylvania, USA, 1979  
Supervisor: Scott Weinstein

## 6. 1980–1989

**6.1. The Faculty of Mathematics of Belgrade University.** From 1980 to 1989 the following dissertations in logic appeared at the Faculty of Mathematics in Belgrade:

**Slobodan Vujošević,**  
Prilog teoriji Hejtingovih algebri\*  
(A Contribution to the Theory of Heyting Algebras), 1982  
Supervisor: Žarko Mijajlović

**Aleksandar Jovanović,**  
Prilog teoriji ultraproizvoda\*  
(A Contribution to the Theory of Ultraproducts), 1982  
Supervisor: Žarko Mijajlović

**Milan Božić,**  
Prilog semantici relevantnih logika\*  
(A Contribution to Semantic of Relevant Logics), 1983  
Supervisor: Aleksandar Kron

**Miodrag Rašković,**  
Logike sa merom u Lajbnicovom univerzumu\*  
(Logics with Measure in Leibniz's Universe), 1983  
Supervisor: Žarko Mijajlović

Vujošević's dissertation is a contribution to the theory of Heyting algebras and Jovanović's to the theory of ultraproducts (model theory). The results of Božić's dissertation belong to relevant logic and Rašković's dissertation is a contribution to the area of Probabilistic logics.

The following dissertations in logic are from the same period:

**Rade Živaljević,**  
Deset etida o hiperkonačnom\*  
(Ten Etides about Hyperfiniteness), 1983  
Supervisor: Žarko Mijajlović

**Branislav Boričić,**  
Prilog teoriji intermedijalnih iskaznih logika\*  
(A Contribution to the Theory of Intermediate Propositional Logics), 1984  
Supervisor: Slaviša Prešić

**Milan Grulović,**  
Forcing u teoriji modela\*  
(Forcing in Model Theory), 1984  
Supervisor: Žarko Mijajlović

**Djordje Vukomanović,**  
Implikacija i mreže (ogled o implikaciji)\*  
(Implication and Lattices (an essay about implication)), 1985  
Supervisor: Aleksandar Kron

Živaljević's dissertation is a contribution to nonstandard analysis and Boričić's dissertation to the theory of intermediate logics. Grulović's dissertation is a contribution to model theory and the results of Vukomanović's dissertation belong to the area of deductive implicative algebras.

Now we are going to present the dissertations which belong not only to logic, but to algebra too:

**Danijel Romano,**

Konstruktivna algebra-algebarske strukture i prsten endomorfizama\*

(Constructive Algebra-Algebraic Structures and the Ring of Endomorphisms), 1986

Supervisors: Milan Božić i Kosta Došen

**Mirjana Šovljanski,**

Epistemičke i intuicionističke aritmetike\*

(Epistemic and Intuitionistic Arithmetics), 1988

Supervisor: Zoran Marković

Next, we present the dissertations which are contributions to algebra:

**Aleksandar Krapež,**

Prilog teoriji funkcionalnih jednačina na kvazigrupama\*

(A Contribution to the Theory of Functional Equations on Quasigroups), 1980

Supervisor: Branka Alimpić

**Dragić Banković,**

Reproduktivna rešenja jednačina\*

(Reproductive Solutions of Equations), 1980

Supervisor: Slaviša Prešić

**Sava Krstić,**

Kvadratni kvazigrupni identiteti\*

(Square Identities of Quasigroups), 1985

Supervisor: Branka Alimpić

Finally, we are going to mention the dissertations which are contributions to computer science:

**Petar Hotomski,**

Metode i pravila za mehaničko dokazivanje teorema u teorijama prvog reda matematičkom indukcijom\*

(Methods and Rules for Mechanical Theorem Proving in the First Order Theory by Mathematical Induction), 1982

Supervisor: Marica Prešić

**Irena Pevac,**

Dokazivanje teorema prirodnim izvodenjem uz pomoć računara\*

(Automated Theorem Proving by the Natural Deduction using Computers), 1987

Supervisor: Marica Prešić

**6.2. The Faculty of Electronics of the University of Niš.** In 1982 Milan R. Vukadinović obtained PhD Degree at the Faculty of Electronics from Niš, and his dissertation is a contribution to logical area of Boolean Functions:

**Milan R. Vukadinović,**

Jedan prilaz razvoju Bulovih funkcija u različitim bazama

(An Approach to Development of Boolean Functions in Different Bases), 1982

Supervisor: Živko Tošić

**6.3. Universities in Europe and America.** From 1980 to 1989 the following dissertations in logic were obtained at the Universities in United Kingdom and America:

**Kosta Došen,**

Logical Constans an Essay in Proof Theory\*,

Litterae Humaniores in the University of Oxford, UK, 1980

Supervisors: Michael Dummett i Dana Scott

**Boban Veličković,**

Contribution to Combinatorial Set Theory,

University of Wisconsin, Madison, USA, 1986

Supervisor: Kenneth Kunen

Došen's dissertation is a contribution to proof theory and Veličković's to combinatorial set theory.

We also mention Harizanov's dissertation and Perović's dissertation which belong to computer science and algebra, respectively:

**Valentina Harizanov,**

Degree Spectrum of a Recursive Relation on a Recursive Structure,

University of Wisconsin, Madison, USA, 1987

Supervisor: Terrence Millar

**Žikica Perović,**

Cardinalities of Algebraic Structures Satisfying Completeness and Saturation Conditions,

University of Minnesota, Minneapolis, USA, 1987

Supervisor: Karel Prikry

## 7. 1990–1999

From 1990 to 1999 some dissertations in logic were obtained not only at the Faculty of Mathematics of Belgrade University, but also at the Faculty of Science of the University of Kragujevac and at the Department of Mathematics and Informatics of the University of Novi Sad.

**7.1. The Faculty of Mathematics of Belgrade University.** The dissertations in logic are the follows:

**Zoran Petrić,**

Jednakosti izvodenja u kategorijalnoj teoriji dokaza\*

(Equivalens in Proofs of Categorical Proof Theory), 1997

Supervisor: Kosta Došen

**Mirjana Borisavljević,**

Sekventi, prirodna dedukcija i multikategorije\*

(Sequents, Natural Deduction and Multicategories), 1997

Supervisor: Kosta Došen

**Žana Kovijanić,**

Kombinatorno-vjerovatnosni metod u problemima prebrojavanja K-značne logike

(Combinatorial-Probability Method in Problems of Counting the K-valued Logic), 1999

Supervisor: Rade Živaljević

Petrić's dissertation is a contribution to categorical proof theory and Borisavljević's to proof theory. Kovijanić's dissertation is a contribution to the area of K-valued logic.

There is also one dissertation in computer science:

**Miodrag Kapetanović,**  
Metod semantičkih tabloa\*  
(A Method of Semantic Tables), 1996  
Supervisor: Slaviša Prešić

**7.2. The Faculty of Science of the University of Kragujevac.** These two dissertations in logic were appeared at the Faculty of Science in Kragujevac:

**Radosav Djordjević,**  
Verovatnosne logike\*  
(Probability Logics), 1991  
Supervisor: Miodrag Rašković

**Zoran Ognjanović,**  
Neke verovatnosne logike i njihove primene u računarstvu\*  
(Some Probability Logics and their Applications in Computer Sciences), 1999  
Supervisor: Miodrag Rašković

Djordjević's dissertation is a contribution to probability logics and Ognjanović's to probability logics and computer science.

**7.3. The Department of Mathematics and Informatics of the University of Novi Sad.** The following dissertations were obtained at the Department of Mathematics and Informatics in Novi Sad:

**Silvia Gilezan,**  
Tipovi sa presekom u računu lambda i logici  
(Intersection Types in Lambda Calculus and Logic), 1993  
Supervisor: Kosta Došen

**Miloš Kurilić,**  
Redukovani ideal-proizvod topoloških prostora  
(Reduced ideal-product of topological spaces), 1994  
Supervisor: Gradimir Vojvodić

Gilezan's dissertation is a contribution to lambda calculus and Kurilić's to topology.

**7.4. Universities in Europe and America.** From 1990 to 1999 the following dissertations in logic were obtained at the Universities in Europe and America:

**Aleksandar Ignjatović,**  
Fragments of First and Second Order Arithmetic and Length of Proofs,  
University of California at Berkeley, USA, 1990  
Supervisor: Jack Howard Silver

**Željko Sokolović,**  
Model Theory of Differential Fields,  
University of Notre Dame, Indiana, USA, 1992  
Supervisor: Anand Pillay

**Miroslav Martinović,**  
An Evaluation System for Parsing and Generation Algorithms\*,  
Courant Institute of Mathematical Sciences, New York University, USA, 1992  
Supervisor: Tomek Strzalkowski

**Djordje Čubrić,**  
Results in Categorical Proof Theory,  
McGill University, Montreal, Canada, 1993  
Supervisor: Mihly Michael Makkai

**Predrag Tanović,**

Fundamental Order and the Number of Countable Models\*,  
McGill University, Montreal, Canada, 1994

Supervisor: James Loveys

**Zoran Spasojević,**

Gaps, Trees and Iterated Forcing,  
University of Wisconsin, Madison, USA, 1994

Supervisor: Kenneth Kunen

**Ilijas Farah,**

Analytic Ideals and their Quotients,  
University of Toronto, Toronto, Canada, 1997

Supervisor: Stevo Todorčević

**Nataša Rakić,**

Common Sense Time and Special Relativity,  
University of Amsterdam, Holland, 1997

Supervisors: Johan F. A. K. van Benthem i Frank J. M. M. Veltman

Tanović's, Sokolović, Spasojević's and Farah's dissertations are contributions to model theory and Ignjatović's to the area of first and second order arithmetic. Čubrić's dissertation is a contribution to categorical proof theory and Martinović's to computer science. Results of Rakić's dissertation belong to philosophy.

**8. 2000–2010**

**8.1. The Faculty of Mathematics of Belgrade University.** The dissertations in logic are the follows:

**Milenko Mosurović,**

Složenost opisnih logika s modalnim operatorima\*  
(On the Complexity of Description Logics with Modal Operators), 2001

Supervisors: Žarko Mijajlović i Michael Zakharyashchev

**Nebojša Ikodinović,**

Neke verovatnosne i topološke logike\*  
(Some Probability and Topological Logics), 2006

Supervisor: Radosav Djordjević

**Aleksandar Perović,**

Neke primene formalne metode u teoriji skupova, teoriji modela, verovatnosnim logikama i fazi logikama\*

(Some Applications of the Formal Method in Set Theory, Model Theory, Probability Logics and Fuzzy Logics), 2008

Supervisor: Aleksandar Jovanović

**Mirjana Isaković-Ilić,**

O nekim supstrukturalnim logikama\*  
(On some Substructural Logics), 2008

Supervisor: Miodrag Kapetanović

Mosurović's dissertation is a contribution to description and modal logics and Ikodinović's to probability and topological logics. Perović's dissertation is a contribution to set theory and probability logics and Isaković-Ilić's to substructural logics.



There are also two dissertations in computer science:

**Predrag Janičić,**

Ugradnja procedura odlučivanja u sisteme za automatsko rezonovanje  
(Building Decision Procedures into Systems for Automated Reasoning), 2001

Supervisors: Žarko Mijajlović i Alan Bundy

**Filip Marić,**

Formalizacija, implementacija i primene SAT rešavača\*

(Formalization, Implementation and Applications of SAT Solvers), 2009

Supervisor: Predrag Janičić

**8.2. The Department of Mathematics and Informatics of the University of Novi Sad.** The dissertations in logic are the follows:

**Jovanka Pantović,**

Potpunost, relativna potpunost i funkcionalna potpunost

(Completeness, Functional Completeness and Relative Completeness), 2000

Supervisor: Gradimir Vojvodić

**Boris Šobot,**

Games on Boolean Algebras, 2009

Supervisor: Miloš Kurilić

We will also mention one dissertation in topology:

**Aleksandar Pavlović,**

Sequential Topologies on Boolean Algebras, 2009

Supervisor: Miloš Kurilić

**8.3. Universities in Europe and America.** From 2000 to 2010 the following four dissertations in computer science were obtained at other Universities in Europe and America:

**Goran Nenadić,**

Mining for Terms and their Similarities from Domain-specific Literature,

Informatics Research Institute, School of Computing, Science and Engineering, University of Salford, UK, 2003

Supervisor: Sophia Ananiadou

**Silvia Likavec,**

Types for Object-Oriented and Functional Programming Languages,

University of Torino, Italy and Ecole Normale Supérieure de Lyon, France, 2005

Supervisor: Viviana Bono and Pierre Lescanne

**Viktor Kunčak,**

Modular Data Structure Verification,

Electrical Engineering and Computer Science, MIT, USA, 2007

Supervisor: Martin C. Rinard

**Dragiša Žunić,**

Computing with Sequents and Diagrams in Classical Logic - Calculi  $*X$ ,  $dX$  and  $X$ ,

Ecole Normale Supérieure de Lyon, France, 2007

Supervisor: Pierre Lescanne

There is also Miodrag Sokić's dissertation, which is a contribution to Ramsey theory:

**Miodrag Sokić,**

Ramsey Property of Posets and Related Structures,

University of Toronto, Toronto, Canada, 2010

Supervisor: Stevo Todorčević

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